LANDSCAPE CONSERVATION COOPERATIVES

Great Basin

LANDSCAPE CONSERVATION COOPERATIVE

Annual Highlights 2013

The Great Basin Landscape

About the Great Basin Landscape Conservation Cooperative

The Great Basin Landscape Conservation Cooperative (LCC) is one of 22 LCCs established to better integrate science and management to address climate change and other landscape scale issues. The Great Basin LCC is a self-directed partnership of federal and state agencies, tribes, non-governmental organizations, universities, industry representatives as well as others involved in natural and cultural resource management and conservation.

What does the Great Basin LCC do?

The Great Basin LCC links and integrates science information providers with resource managers and science users; brings additional resources to bear on landscape-scale conservation issues and opportunities; and helps to apply science and facilitate coordination of a wide range of efforts to respond to climate change, invasive species, wildfires, human development and other stressors across the Great Basin. Specific objectives and shared priorities are determined by the partnership itself. The LCC is not intended to replace existing organizations already accomplishing conservation work in the Great Basin, rather, the aim is to facilitate, enhance and inform their work.

Mission

The Great Basin LCC enhances understanding of the effects of changing climate and other natural and human impacts across the region and promotes the coordination of science-based actions to enable human and natural communities to respond and adapt to those conditions.

Goals

- Provide **leadership** and a framework linking science and management to address shared ecological, climate, and social and economic issues across the basin.
- **Focus science and management actions** to sustain natural resources in the context of changing environmental conditions.
- **Enhance collaboration** to integrate science and management among Great Basin LCC partners, particularly as related to climate change and other landscape-scale change agents.
- **Promote communication** and education.

Highlights of 2013

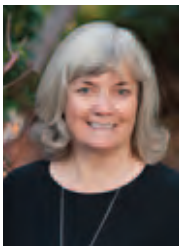
- Funded a range of science research projects in the Great Basin. *Read updates from each project on page 4.*
- Worked to develop a Challenges and Opportunities Report using BLM's Central Great Basin and Range Rapid Ecological Assessment to identify larger landscape conservation issues and potential solutions that require collaboration with partners to achieve.
- Co-hosted a three-day training course *"Climate Adaptation Training for Tribes"*, attended by 24 members of 18 tribes. *Read more about the course of page 9.*
- Secured funding from the Joint Fire Science Program to fund *"The Great Basin Consortium: A Landscape Under Fire"*.
- Supported opportunities for collaboration with partners across the region. *Read more on page 11.*

The Great Basin LCC sits between the Rocky and Sierra Nevada Ranges and covers nearly all of Nevada, and parts of Oregon, California, Utah and Idaho. The Basin's 145,000 square miles includes the largest desert in North America and the largest national forest in the lower 48 states.

Great Basin LCC Steering Committee

The Great Basin LCC Steering Committee includes 26 representatives from federal and state agencies, tribes, non-governmental organizations, universities, industry and others from the five-state Great Basin region. Since 2011, the Steering Committee has adopted a charter; established issue-based working groups; and supported collaborative efforts and research projects in the Great Basin. In 2013, the Great Basin LCC used science funding to support six projects and began their review of the Bureau of Land Management's Central Great Basin and Range Rapid Eco-regional Assessment (CGBR REA).

Great Basin LCC Staff



Ms. Linda Kelly
Coordinator

Dr. Todd Hopkins
Science Coordinator

Dr. Matt Germino
Research Ecologist

Great Basin LCC partnership provides funds to advance scientific research for habitat restoration and monitoring

$1.2 million in LCC and match funding support six Great Basin research projects

In 2013, the Great Basin LCC leveraged $200,000 in federal science funding to secure more than $900,000 and support six projects that advanced scientific research and the overall mission of the LCC.

The U.S. Fish and Wildlife Service provided funds to the Great Basin LCC to support science research in the region. This action resulted in the convening of the Great Basin LCC Science Working Group, which used the LCC's mission, goals and objectives to identify selection criteria and recommend projects for funding:

- Support the LCC in developing science priorities
- Ensure projects align with and work towards the objectives of the LCC
- Leverage/add value to ongoing work or fill a critical unmet, unfunded need
- Consider needs of partners
- Link to cross disciplines and topical areas
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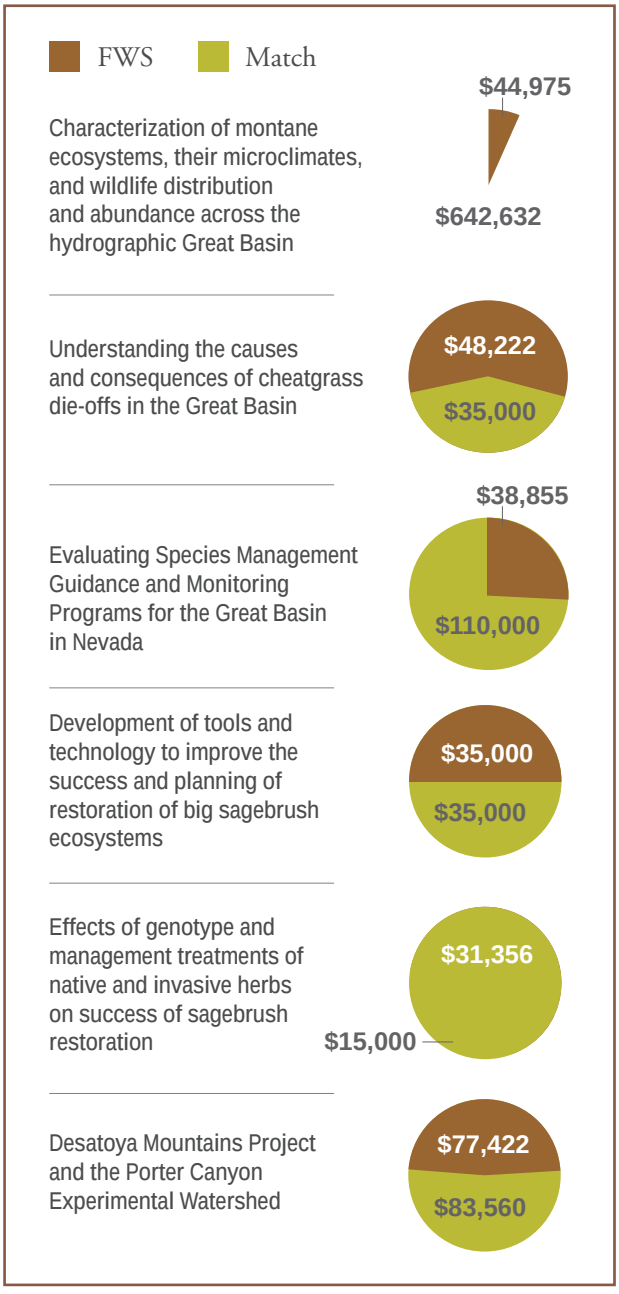


2013 Funded Research Projects

Declines in pika population across Great Basin linked to drought

American pikas are continuing to decline across much of the Great Basin, in contrast to their trends in some other parts of their geographic range. The small rabbit-like mammal that lives in rocky slopes at high elevations in the mountains of the American West has disappeared from sample sites in the last decade at a rate five times faster than they disappeared during the 20th century.

Pika distribution and density observed in sampling during 2012 and 2013 indicated a strong effect of drought. Results indicate that climate and wildlife vary markedly across space and time in the Great Basin, and water stress appears to have both direct and indirect effects on mountain ecosystems and their wildlife.

In 2013, new sensors were used to monitor both pikas and the microclimates in mountains across 100 million acres of the Great Basin. The sensors span 19 different mountain ranges to gather climate data to describe

Field technician working in microclimates in the Pine Forest Range near Duffer Peak, Nevada

conditions relevant to pikas as well as to quantify general microclimatic conditions in mountains.

Paper: *Characterization of montane ecosystems, their microclimates, and wildlife distribution and abundance across the hydrographic Great Basin - The Pika Story*
Author: Dr. Erik Beever, US Geological Survey, NOROCK Science Center
Funding: FWS: $44,975 Match: $642,642

Cheatgrass die-off provides potential to re-establish native grass

Naturally occurring 'die-offs' occasionally appear within dense stands of cheatgrass in the Great Basin, leaving areas of several square meters to many acres temporarily free of the exotic grass. Although the cause of die-offs is not yet known, scientists are exploring whether these areas may serve as opportunities for restoring native grasses.

Seedlings were planted in one die-off site south of Winnemucca, into areas that had experienced die-off the previous year as well as adjacent control areas that had not experienced die-off. After one growing season, preliminary results showed that while seed emergence was lower in die-off areas than in control areas, survival and growth of emerging seeds was higher in die-offs. This indicates that native grasses can establish in a recent die-off, and that die-off conditions are potentially favorable for seedling survival and growth.

Researchers investigating seedling growth in an area south of Winnemucca

Continued monitoring of this project will help determine long-term survival of native seeds, and provide information on the restoration potential of the die-off phenomenon.

Paper: *Understanding the causes and consequences of cheatgrass die-offs in the Great Basin*
Author: Dr. Elizabeth Leger, University of Nevada, Reno
Funding: FWS: $48,222 Match: $35,000

Great Basin Bird Observatory to evaluate and update management guidance for 35 wildlife species

The Great Basin Bird Observatory will consolidate, evaluate, streamline, and update species management guidance for as many as 35 focal vertebrate species, which will greatly increase the likelihood that best management practices and best available biological knowledge will be routinely applied to management decisions. Additionally, the sufficiency of current monitoring programs will be evaluated for each focal species, and recommendations will be made regarding high priority monitoring and research needs that could fundamentally improve existing species guidance.

Currently, resource management agencies in Nevada's Great Basin region derive species management guidance from a wide variety of sources which has led to inefficiencies, inconsistencies, and inadequacies in the application of species management guidance.

Paper: *Evaluating Species Management Guidance and Monitoring Programs for the Great Basin in Nevada*
Author: Dr. Elisabeth Ammon, Great Basin Bird Observatory
Funding: FWS: $38,855 Match: $110,000

Researchers test effectiveness of sagebrush restoration treatments after fire

Loss of big sagebrush habitat is a critical issue for conservation of sagebrush-dependent species, such as Greater Sage Grouse. Big sagebrush is intolerant of fire – it cannot resprout after burning and has limited seed bank longevity and dispersal. Efforts to plant or seed big sagebrush have occurred following wildfires, but often with limited restoration success.

In 2013, researchers planted young sagebrush seedlings to evaluate how initial establishment of sagebrush is influenced by management treatments and to how this effect varies among different seed sources of big sagebrush under different climate conditions. Seedlings were planted in burned and unburned sites with treatments that included herbicide control of exotics, drill seeding of native herbs, mowing to reduce fuels and fencing.

Paper: *Effects of genotype and management treatments of native and invasive herbs on success of sagebrush restoration*
Author: Dr. Matt Germino, US Geological Survey
Funding: FWS: $31,356 Match: $15,000

Tools and technology developed to improve success of big sagebrush ecosystem restoration

Maintaining habitat and forage for sage grouse and other wildlife species depends on the successful restoration of sagebrush ecosystems. Restoration requires correctly identifying, certifying and deploying seed to the appropriate environmental niche to ensure planting success.

Two different subspecies diagnostic tests are being developed based on seed weight and chemical volatile profiles (i.e., smells) to assist resource managers to identify the most appropriate seed sources to plant to enhance the success of restoration under current and future climates. Preliminary data suggest basin big sagebrush has significantly lighter seed than Wyoming or mountain big sagebrush seed.

Paper: *Development of tools and technology to improve the success and planning of restoration of big sagebrush ecosystems*
Author: Dr. Bryce Richardson, USDA Forest Service, Rocky Mountain Research Station
Funding: FWS: $35,000 Match: $35,000

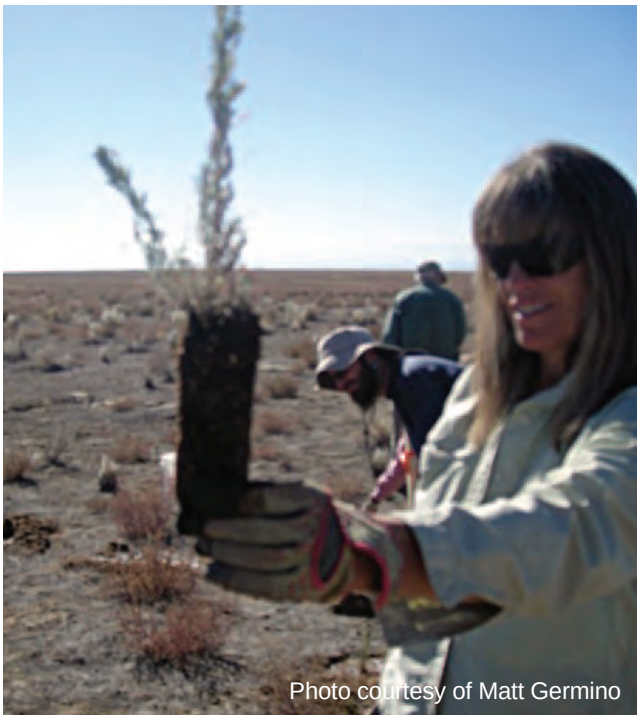
New data collection tools contribute to research on effects of removing pinon and juniper from historic sagebrush lands

Researchers have expanded a network of sensors to improve an integrated watershed model to study the effects of removing piñon and juniper from lands previously dominated by sagebrush. The work is being conducted in the Porter Canyon Experimental Watershed in central Nevada and the added sensors will contribute ground-truthing data to the model.

The sensors installed in 2013 measure sap flow, soil moisture, weather variables, groundwater depth, spring flow and channel flow. Results to dates indicate that piñon and juniper water use was variable among trees, but similar to between the species. Simulated rainfall interception rates were found to be about 44 percent of the total rainfall applied for both species.

Piñon and juniper removal treatments within one type of plant community produced areas with and without wood slash. The simulated rainfall events indicate that there was no difference between areas with and without slash in terms of total water runoff. However, in areas with slash, the sediment runoff was reduced to 20 percent of the total compared to areas with no slash.

Paper: *Desatoya Mountains Project and the Porter Canyon Experimental Watershed*
Author: Dr. Keirith Snyder, USDA Forest Service, Agricultural Research Station
Funding: FWS: $77,422 Match: $83,560



Anne Halford, Restoration Ecologist, holding a sagebrush seedling before planting.

Black Rock Desert Hot Springs and Playa at the Applegate National Historic Trail

Bureau of Land Management seeks Great Basin LCC peer review of the Central Great Basin and Range Eco-regional Assessment

The Great Basin LCC is leading the effort in reviewing the Bureau of Land Management's (BLM) Central Great Basin and Range Rapid Eco-regional Assessment (CGBR REA) and developing a Challenges and Opportunities Report to for the BLM to help identify large landscape conservation issues and potential solutions that require collaboration across partners to achieve. This will be presented to the BLM in fall 2014. The Bureau of Land Management is also looking to the Great Basin LCC's work to help serve as a model for this type of review for future Rapid Eco-regional Assessments.

Teams of LCC partners are reviewing and developing recommendations for the report in the following theme areas:

- Hydrologic function
- Biotic integrity
  - Plant Ecology
  - Wildlife
  - Disturbance/Development
- Soil and site stability
- Landscape metrics
  - pattern
  - patch size
  - connectivity
- Climate change

Research from our partner Climate Science Centers

In 2008, the Department of the Interior (DOI) established eight regional Climate Science Centers (CSC) that provide scientific information and tools to natural and cultural resource managers as they plan for conserving these resources in a changing world. Landscape Conservation Cooperatives (LCCs) are critical partners of CSCs and help define the regional priorities of each CSC.

Great Basin LCC staff serve on the stakeholder advisory groups for both the Northwest and Southwest Climate Science Centers - a mechanism for providing management-relavent needs to the Climate Science Centers. In addition, Great Basin LCC staff serve as peer-reviewers for the proposal review processes for both Climate Science Centers.

NW CSC
Northwest Climate Science Center

2013 Projects from the Northwest Climate Science Center

www.doi.gov/csc/northwest/index.cfm

Climate, Land Management and Future Wildlife Habitat in the Pacific Northwest

Emilie Henderson, Oregon State University.

Sagebrush Ecosystems in a Changing Climate

Dr. Matt Germino, U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center.

Southwest Climate Science Center

2013 Projects from the Southwest Climate Science Center

www.swcsc.arizona.ecu

Linking Climatic, Hydrological, and Ecological Changes at Intermediate Timescales in a Great Basin Watershed

Alexandra Lutz, Desert Research Institute.

Preliminary Assessment of the Landscape of Climate Relevant Resource Management Decisions in the Southwest

Mark W. Schwartz, University of California, Davis.

Schell Creek Range, Nevada

Partners in Conservation

Building relationships with Tribes in the Great Basin and planning for climate change impacts in the region.

The Great Basin LCC partnered with the Institute of Tribal Environmental Professionals, the California Nevada Applications Program and the Desert Research Institute to hold a three-day training course titled "Climate Adaptation Training for Tribes" this fall. The training was attended by 24 members of 18 tribes; some attendees travelled from Alaska to participate in this training. The course was deemed a great success by participants and provided an introduction to planning for climate change impacts and highlighted the work of several tribes.

The Great Basin LCC aims to maintain strong connections with tribes and their environmental and natural resource professionals, especially for the development of the Science and Traditional Ecological Knowledge Strategy being developed in 2014.

As part of this training, Dr Kurt Johnson, the National Climate Scientist for the U.S. Fish and Wildife Service created a guide titled *Climate Change Vulnerabilty Assessment: A biobliography of tools and case studies for*

"The variety of Tribal representation is excellent in that a wide variety of Tribal experience benefits everybody."

"The field trip was a wonderful opportunity to visit the Pyramid Lake Reservation and learn more about the management of their Natural Resources and the challenges faced by the tribe due to climate change."

"I appreciated the opportunity to learn from our neighbors and discuss climate change adaptation strategies that may also work for the Summit Lake Indian Reservation."

Fieldtrip to Pyramid Lake as part of the Climate Adaptation Training for Tribes

Supporting resource management decisions in a changing climate

Great Basin Climate Forum

The Great Basin LCC, in collaboration with the California Nevada Applications Program and the Western Regional Climate Center hosted two Great Basin Climate Forum during the year.

The forums summarized the current climate conditions in the Great Basin and how resource management decisions are made in relation to weather and climate.

Visit the Desert Research Institute's website (www.dri.edu/great-basin-climate-forum-2013) to see the presentations given at the forum.

In the spring, the Great Basin LCC held a forum at the Desert Research Institute in Reno, Nevada. Forum topics centered around on-going drought conditions in the Great Basin with in-depth presentations on the following topics:

- Nevada drought response and coordination efforts
- Fire behavior and climate in the Great Basin
- Overview of current climate and hydrology prospects
- Drought effects on horse and burro populations in Nevada

In the fall, the Great Basin LCC hosted a second forum at the Tallman Pavilion at Tri-County Fairgrounds in Bishop, California. The theme was the relationship between people and climate. In-depth presentations included:

- Weather, climate, and hydrology in the Great Basin
- Drought challenges to the ecological integrity of Sierra streams and Great Basin lakes
- Reconnecting the relationship between people and climate to develop ecological values
- Take away messages from the Climate Boot Camp 2013
- Summary of recent climate observations in the Western Great Basin
- Climate variability and management options in the Great Basin

Great Basin Weather and Climate Dashboard

The Great Basin Weather and Climate Dashboard is an online tool to help stakeholders locate the weather and climate information they need to make decisions related to the current drought in the Great Basin.

Check it out: www.gbdash.dri.edu

The Great Basin Consortium conference titled "The Great Basin: A Landscape Under Fire.

Bringing partners in the Great Basin together

The Great Basin Consortium is an informal association comprised of the Great Basin Cooperative Ecosystem Studies Unit, the Great Basin Environmental Program, the Great Basin Landscape Conservation Cooperative, the Great Basin Fire Science Delivery Program, the Great Basin Research and Management Partnership, and the Great Basin Restoration Initiative that coordinates and collaborates on science delivery in the Great Basin.

In December, the Consortium held its annual conference titled "The Great Basin: A Landscape Under Fire." Issues from across the region and across agencies and organizations were discussed such as sage grouse, fire and climate change adaptation strategies.

To learn more about the consortium and view conference proceedings, visit http://environment.unr.edu/consortium/index.html

Consortium Mission

Our mission is to increase communication and coordination among the partner organizations in order to enhance the effectiveness of their research, management, outreach and funding activities.

Key Publications from LCC Partners

Beever EA. Mattson BJ, Germino MJ, Post van der Burg M, Bradford JB, Brunson MW. In Press. *Exploring successes and challenges of broad-scale conservation across the globe.* Conservation Biology. DOI: 10.1111/cobi.12233

Chambers JC. Bradley BA, D'Antonio C, Germino MJ, Grace J, Hardegree SP, Miller RF, Pyke DP. In Press. *Resilience to Stress and Disturbance, and Resistance to Bromus tectorum L. Invasion in Cold Desert Shrublands of Western North America.* Ecosystems. DOI: 10.1007/s10021-013-9725-5

Germino MJ. Plants in Alpine Environments. In: "The Plant Sciences – Ecology and the Environment" (26 pages) Editor: R Monson. Springerreference.

Richardson BA, Kitchen SG, Pendelton RL, Pendelton BK, Germino MJ, Rehfeldt GE, Meyer SE. 2014. *Adaptive responses reveal contemporary and future ecotypes in a desert shrub.* Ecological Applications, 24:41-427.

Sorensen, P.O., Germino, M.J., Feris, K. 2013. *Microbial community responses to 17 years of altered precipitation are seasonally dependent and coupled to co-varying effects of water content on vegetation and soil carbon.* Soil Biology and Biochemistry, 64: 155-163

Wagenbrenner N, Germino M, Lamb B, Robichaud P, Foltz R. 2013. *Wind erosion from a sagebrush steppe burned by wildfire: Measurements of PM10 and horizontal sediment flux.* Aeolian Research. 10:25-36

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Steering Committee Member Organizations

Bureau of Land Management

California Department of Fish and Wildlife

Confederated Tribes of the Goshute Reservation

Duckwater Shoshone Tribe

Eastern Nevada Landscape Coalition

Farm Service Agency, USDA

Great Basin Cooperative Ecosystem Studies Unit

Great Basin Environmental Program

Great Basin Water Network

Lahontan Audubon Society

Natural Resources Conservation Service

Nevada Department of Wildlife

Nevada Mining Association

PacifiCorp

Paiute Indian Tribe of Utah

Partnership for National Trails

Public Lands Council

State of Utah

The Nature Conservancy

Upper Snake River Tribe Foundation

US Fish and Wildlife Service

US Forest Service

US Geologica

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